No. 811,886. PATENTED FEB. 6, 1906.

T. H. WHELESS.

CONSTRUCTION OF SUBMARINE BOATS.

APPLICATION FILED NOV. 3, 1903.

3 SHEETS—SHEET 1.

Fig. 1.

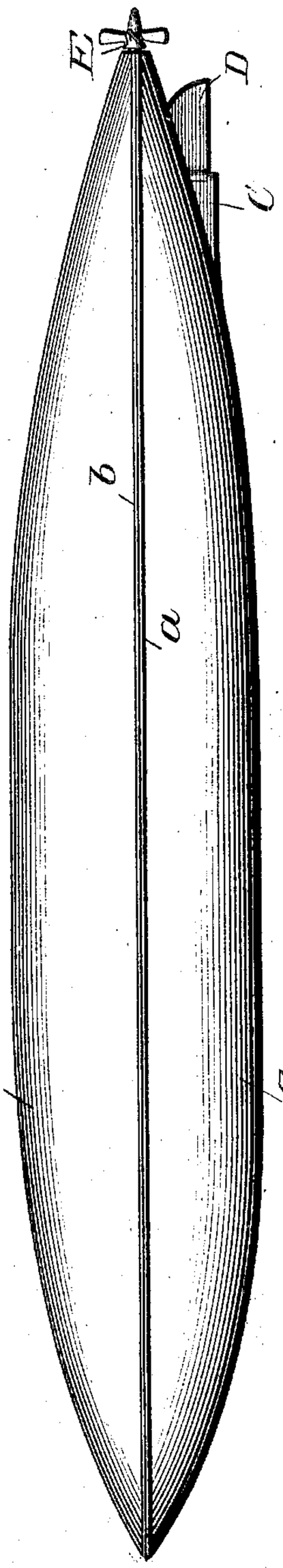
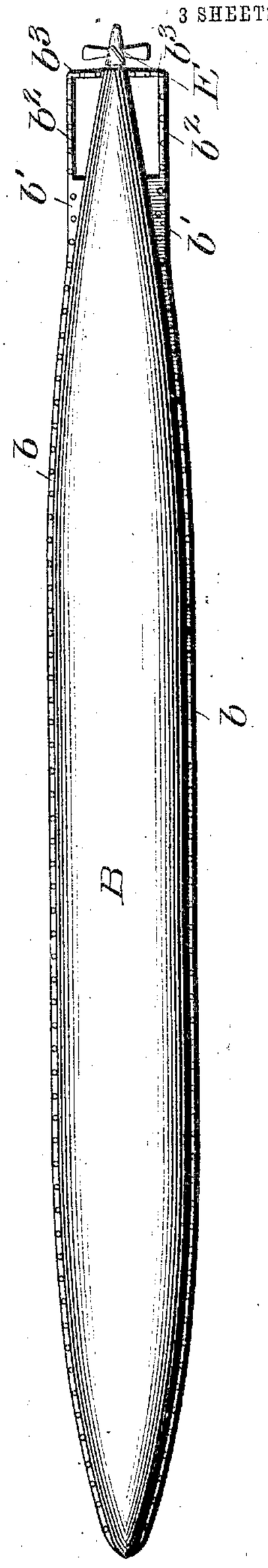


Fig. 2.



Witnesses
Geo. H. Bruce
L. Burr.

Inventor
T. H. Wheless.
By Wilkinson & Fisher,
Attorneys.

No. 811,886. PATENTED FEB. 6, 1906.

T. H. WHELESS.

CONSTRUCTION OF SUBMARINE BOATS.

APPLICATION FILED NOV. 3, 1903.

3 SHEETS—SHEET 2.

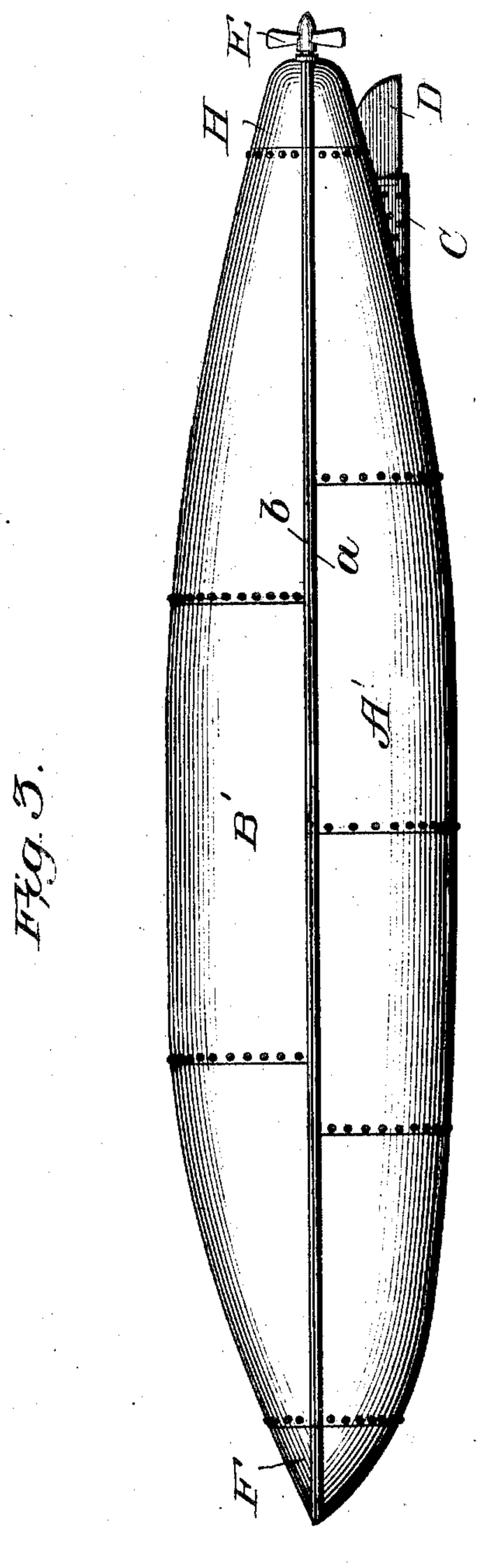


Fig. 3.

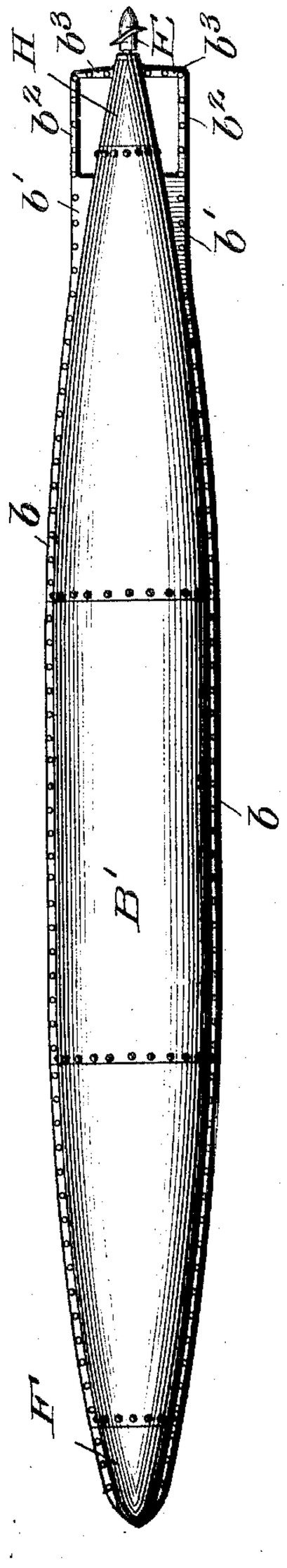


Fig. 4.

Witnesses
Geo. H. Boyce.
L. Bunz.

Inventor
T. H. Wheless.
By Wilkinson & Fisher,
Attorneys.

No. 811,886. PATENTED FEB. 6, 1906.

T. H. WHELESS.

CONSTRUCTION OF SUBMARINE BOATS.

APPLICATION FILED NOV. 3, 1903.

3 SHEETS—SHEET 3.

Fig. 5.

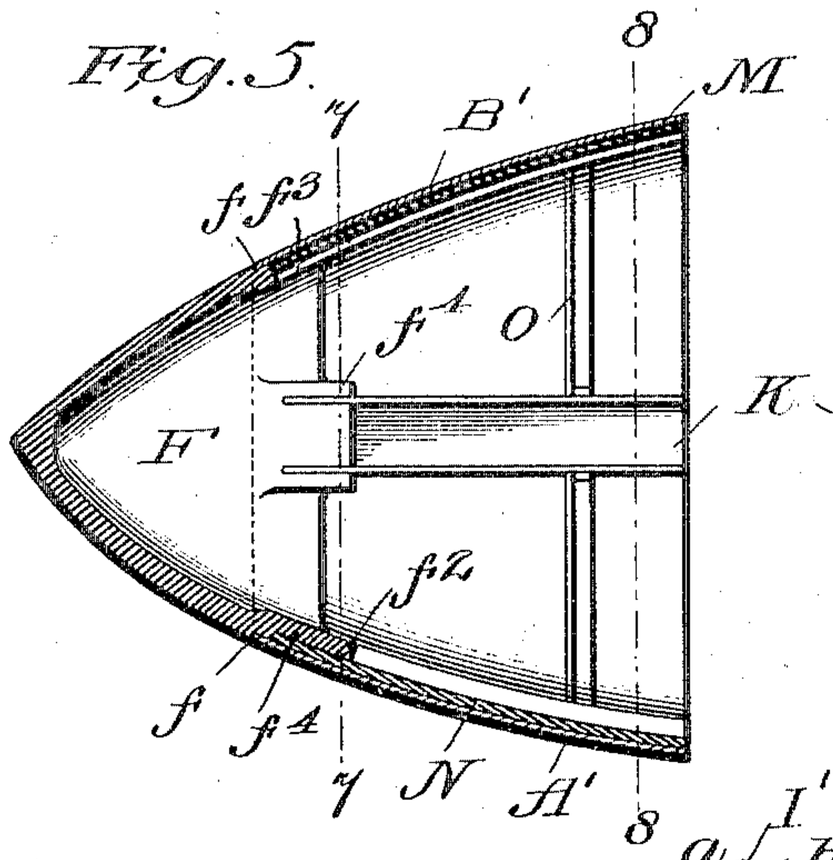


Fig. 6.

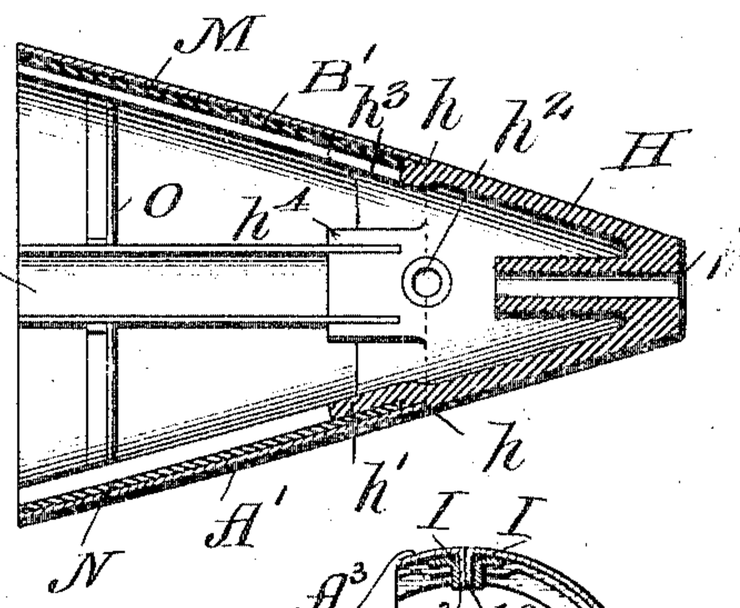


Fig. 9.

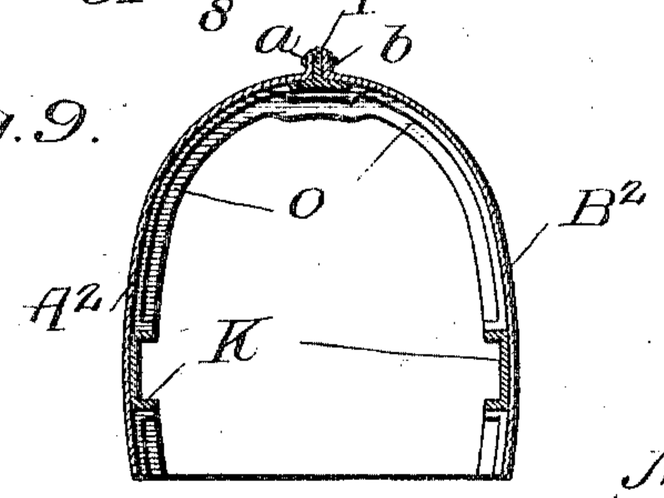


Fig. 10.

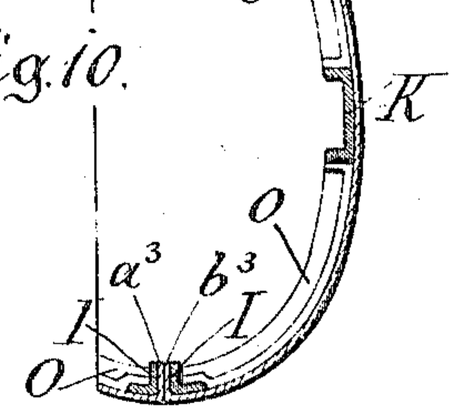


Fig. 7.

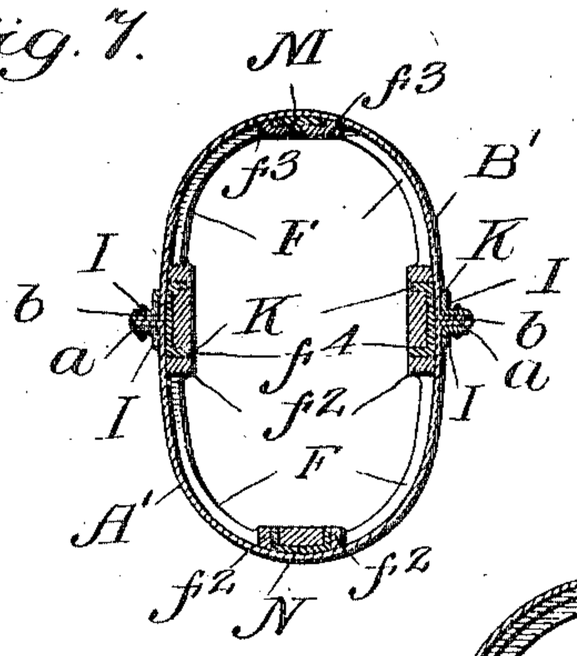


Fig. 8.

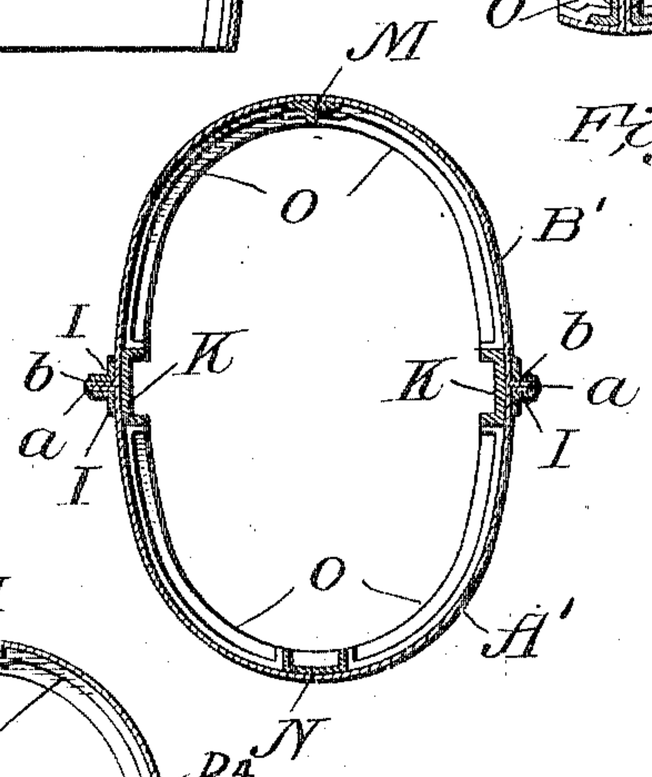
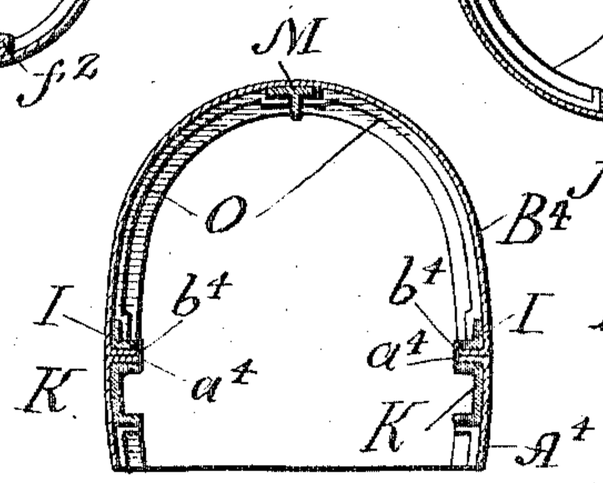


Fig. 11.



Witnesses

Geo. T. Bruce

L. Bunz.

Inventor

T. H. Wheless.

By Williamson & Fisher,

Attorneys.

UNITED STATES PATENT OFFICE.

THOMAS HENRY WHELESS, OF NEW YORK, N. Y.

CONSTRUCTION OF SUBMARINE BOATS.

No. 811,886. Specification of Letters Patent. Patented Feb. 6, 1906.

Application filed November 3, 1903. Serial No. 179,745.

To all whom it may concern:

Be it known that I, THOMAS HENRY WHELESS, a citizen of the United States, residing at New York city, in the borough of Manhattan and State of New York, have invented certain new and useful Improvements in the Construction of Submarine Boats, (Case F;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in the construction of vessels, and more especially to the construction of submarine vessels. In the ordinary construction of these vessels as it is now generally carried out the frame of the vessel is first built and is provided with hatches or openings of more or less limited area, through which the machinery and the interior fittings of the vessel are conveyed, and this can only be done at considerable inconvenience and expense. Moreover, in the cramped space inclosed in the hulls of such vessels it is very difficult for the workmen to work satisfactorily. Moreover, such vessels when constructed according to the present methods are liable to spring leaks.

According to my present invention I construct a hull of two or more superposable portions, preferably running the entire length of the hull, and then when these portions are securely fastened together they constitute a rigid, strong, and water-tight hull. The two portions referred to may be placed one above the other or the two may constitute separate sides of the boat. By having two such members the machinery and inner fittings may be mounted in each member separately, and then the two members of the shell may be put together, thus completing the hull and enabling the workmen to obtain access to the interior thereof without being unnecessarily cramped. By combining a shell made of two or more portions, as already described, with interior framework the hull may be made more rigid. Moreover, in the manufacture of the smaller boats the two halves may be provided with outwardly-projecting flanges that may be secured together from the outside, thus rendering it unnecessary to do any riveting from within.

My invention will be understood by reference to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 is a side elevation, and Fig. 2 a plan view, of the hull of a small submarine boat in which the shell of the hull is composed of two members. Figs. 3 and 4 are similar views of a hull of a larger boat, provided with bow and stern castings, and a series of plates riveted together and connecting the said bow and stern castings. Fig. 5 is a horizontal section through the bow of the boat shown in Figs. 3 and 4, and Fig. 6 is a horizontal section through the stern of the boat shown in Figs. 3 and 4. Fig. 7 shows a cross-section along the line 7 7 of Fig. 5, and Fig. 8 shows a cross-section along the line 8 8 of Fig. 5. Fig. 9 shows a modification in which the two members of the shell of the hull are connected together at top and bottom instead of along the beam, as shown in the other figures. Figs. 10 and 11 show modifications in which the flanges are turned inward, leaving the exterior of the boat flush.

Referring now to Figs. 1 and 2, A represents the lower member of the shell which constitutes the outer portion of the hull, which is preferably made of a continuous sheet of compressed steel and is provided with a flange *a*. Into this lower member the machinery and interior fittings are mounted, and then the upper member B, which is generally similar to the lower member, is put in place. This upper member B is provided with a flange *b*, similar to the flange *a* of the lower member, and these two members may be riveted together or may be electrically welded together or secured in any other convenient way. Of course the usual manholes or hatches, conning-towers, or the like may be provided, if desired.

The interior of the boat shown in Figs. 1 and 2 may be braced in a similar way to that shown in Figs. 5 to 9 and hereinafter to be described or in any other convenient way, if desired. In order to give rigidity to the bearings of the propeller E, the flanges *a* and *b* may be extended rearward, as indicated at b', b^2, and b^3 of Fig. 2. Moreover, a suitable skeg C and rudder D may be provided, if desired.

In practice it might be difficult to secure such large shells of metal, as indicated at A and B in Figs. 1 and 2, all in one piece, and for this reason the two members of these shells may be built up of a number of sheets of

metal, as indicated at A′ and B′ in Figs. 3 to 8. In these figures not only are the shells made up of a number of plates, but bow and stern castings F and H are provided. These castings are rabbeted, as at *f* and *h*, (see Figs. 5 and 6,) to receive the ends of the outer shell A′ and B′ and the stern-piece H bored, as at h^0, to receive the propeller-shaft and as at h^2 to receive the rudder-head. In the larger boats covered with a series of plates it will be necessary to provide suitable framing, and I have shown such a framing in Figs. 5 to 9.

Referring first to Figs. 5 to 8, there are two channel-irons K, extending longitudinally fore and aft along each beam and whose ends engage in sockets f^4 and h^4 in the bow and stern castings F and H, respectively. I also provide a similar channel-iron extending along the bottom of the boat, as indicated at N, which is secured at its ends in recesses f^2 and h' of the bow and stern castings, respectively. I also provide an upper T-beam extending along the top of the boat, as shown at M, which projects into recesses f^3 and h^3 in the bow and stern castings, as indicated in Figs. 5 and 6. Connecting these various longitudinal girders K, K, M, and N are the ribs O, which are made elliptical in form, as indicated in Figs. 7, 8, and 9. The upper portion of the boat has its flanges *b* secured to the flanges *a* of the lower portion of the boat, and these are reinforced by angle-irons I, as shown in Fig. 7 and 8.

The boats are preferably made elliptical in cross-section with the depth of the hull greater than the beam, as indicated in Figs. 7 and 8, the general cross-section representing that of one of the fast-swimming fishes, this shape being found to encounter a comparatively small resistance in passing through the water. Moreover, by having the hull elliptical in cross-section it is very strong to resist such crushing strains as would be experienced in diving to unusual depths.

By having the fillet between the flanges and the body of the plate reinforced by angle-irons and also by having the inner longitudinal girders registering with the flanges and the angle-irons, as shown in Figs. 7 and 8, not only is the resistance of the shell of the boat to crushing strains largely increased, but also great longitudinal rigidity is given to the structure, whereby a very stiff and strong hull is secured. Furthermore, by supplementing the angle-irons and flanges with ribs O, as shown in Figs. 7 to 11, a compound structure is secured which is capable of resisting extremely heavy crushing strains. This renders possible not only the use of thin material, but also serves as protection in case the boat by accident or otherwise descends to any great depth.

While in Figs. 1 to 8 I have shown the two members of the hull as superposed, these members may be secured together at the top and bottom, as indicated in Fig. 9, in which only the top part of a cross-section of the boat is shown, the bottom part being generally similar. In this section the shells A^2 and B^2 are provided with flanges *a* and *b*, which are bolted to the T-iron I′ and are strengthened by the elliptical ribs O and the channel-irons K.

In the modifications shown in Figs. 10 and 11 the flanges are turned inward, leaving the outer surface of the boat flush. Thus in Fig. 10 the parts B^3 A^3 are provided with inwardly-turned flanges b^3 a^3, which are secured together by the angle-irons I, and the shell is stiffened by the fore-and-aft channel-irons K. In the form of device shown in Fig. 11 the parts B^4 and A^4 have flanges b^4 a^4 turned inward and secured between the angle-irons I and the channel-irons K. It will be noted that in Fig. 10 the hull is shown composed of two side members, while in Fig. 11 the hull is shown composed of an upper and lower member.

It will be obvious that the bracing of the interior of the hull may be altered in various ways, dependent upon the size of the boat and other conditions, and that various other modifications might be made in the herein-described construction which could be used without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A hull for submarine boats, consisting of two separate structures provided with flanges along the edges thereof, the said flanges being secured together to form a hull, with angle-irons secured in the fillets of said flanges, substantially as described.

2. In a hull for submarine boats, the combination with a lower flanged member, of an upper flanged member adapted to be secured to the lower, means for securing said flanges together, and longitudinal stiffeners for strengthening the fillets of said flanges, substantially as described.

3. In a hull for submarine boats, the combination with one member provided with a flange along the periphery thereof, of a second member provided with a similar flange registering with the first, means for securing said flanges together, whereby a complete hull is formed, and angle-irons secured in the fillets of said flanges, substantially as described.

4. A hull for submarine boats comprising bow and stern castings, flanged upper and lower members secured to said bow and stern castings and to each other, angle-irons secured in the fillets of said flanges, and framing mounted in said hull for stiffening the same, substantially as described.

5. A hull for submarine boats comprising bow and stern castings, flanged upper and

lower members secured to said bow and stern castings and to each other, angle-irons secured in the fillets of said flanges, fore-and-aft beams connecting said bow and stern castings, and transverse ribs extending between said fore-and-aft beams, substantially as described.

6. A hull for submarine boats comprising bow and stern castings, flanged upper and lower members secured to said bow and stern castings and to each other, fore-and-aft beams projecting into sockets in the said bow and stern castings and connecting the same, and transverse ribs extending between the said fore-and-aft beams, substantially as described.

7. A hull for submarine boats, consisting of two separate structures each semi-elliptical in cross-section provided with flanges along the edges thereof, the said flanges being secured together to form a hull, with angle-irons secured in the fillets of said flanges, substantially as described.

8. A hull for submarine boats comprising bow and stern castings, flanged upper and lower members secured to said bow and stern castings and to each other, each member being semi-elliptical in cross-section, angle-irons secured in the fillets of said flanges, and framing mounted in said hull for stiffening the same, substantially as described.

9. A hull for submarine boats comprising bow and stern castings, flanged upper and lower members secured to said bow and stern castings and to each other, angle-irons secured in the fillets of said flanges, each member being semi-elliptical in cross-section, fore-and-aft beams connecting said bow and stern castings, and transverse ribs extending between said fore-and-aft beams, substantially as described.

10. A hull for submarine boats comprising bow and stern castings, flanged upper and lower members secured to said bow and stern castings and to each other, each member being semi-elliptical in cross-section, fore-and-aft beams projecting into sockets in the said bow and stern castings and connecting the same, and transverse ribs extending between the said fore-and-aft beams, substantially as described.

11. A hull for submarine boats comprising bow and stern castings, flanged upper and lower members secured to said bow and stern castings and to each other, and fore-and-aft side beams connecting said bow and stern castings, and forming a lap-joint with said flanges, substantially as described.

12. A hull for submarine boats comprising bow and stern castings, flanged upper and lower members secured to said bow and stern castings and to each other, fore-and-aft side beams projecting into sockets in the said bow and stern castings and connecting the same, and forming a lap-joint with said flanges, and transverse ribs extending between the said fore-and-aft beams, substantially as described.

13. In a hull for submarine boats, the combination with a lower flanged member, of an upper flanged member adapted to be secured to the lower angle-irons mounted in the fillets of said flanges and bolts securing said angle-irons and flanges together, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS HENRY WHELESS.

Witnesses:
R. M. PARKER,
M. M. O'CONNOR.